

# CHOLESTEROL

Cholesterol is a lipid (fat). It is manufactured by the liver from the fatty foods that we eat, and plays a vital part in allowing the body to function normally. Cholesterol is present in the membrane (outer layer) of every cell in the body. It insulates nerve fibres, and is an essential building block for hormones, such as the sex hormones, and the hormones of the adrenal cortex. It also enables the body to produce bile salts.

Cholesterol is carried in the blood by molecules called lipoproteins. There are several different lipoproteins, but the three main types are:

- **Low density lipoprotein (LDL).** This is often known as *bad cholesterol* and is thought to promote arterial disease. It carries cholesterol from the liver to the cells and can cause a harmful build-up if there is too much for the cells to use. Normally, the blood contains about 70% of LDL, but the level will vary from person to person.
- **High density lipoprotein (HDL).** This is often referred to as *'good cholesterol'*, and is thought to prevent arterial disease. It takes cholesterol away from the cells and back to the liver, where it is either broken down, or is passed from the body as a waste product.
- **Triglycerides** are another type of fatty substance present in the blood. They are found in dairy products, meat and cooking oils. Triglycerides are also produced by the liver. Those who are overweight, have a diet that is high in fatty or sugary foods, or drink a large amount of alcohol, have an increased risk of having a high triglyceride level.

The amount of cholesterol present in the blood can range from 3.6 to 7.8 mmol/litre. A level above 6 mmol/litre is considered high, and a risk factor for arterial disease. A level of below 5.2 mmol/litre is recommended to prevent heart disease.

Evidence strongly indicates that high cholesterol levels can cause narrowing of the arteries (atherosclerosis), heart attacks, and strokes. The risk of coronary heart disease also rises as blood cholesterol levels increase. If other risk factors, such as high blood pressure and smoking, are present, the risk increases even more.

## SYMPTOMS

High cholesterol is not a disease in itself, but it is linked to serious conditions, such as cardiovascular conditions (disease of the heart and blood vessels), angina, stroke, and mini-stroke, known as transient ischemic attack (TIA). A high level of cholesterol in your blood, together with a high level of triglycerides, can increase your risk of developing coronary heart disease.

Coronary heart disease is caused by narrowing of the arteries that supply the heart with blood. This narrowing of the arteries is called atherosclerosis. Fatty deposits, such as cholesterol, cellular waste products, calcium and other substances build up in the inner lining of an artery. This build up, known as plaque, usually affects small and medium sized arteries. The flow of blood through the arteries is restricted as the inside diameter is reduced. Blood clots, which often happen in the coronary arteries during a heart attack, are more likely to develop when arterial walls are roughened by the build up of fatty deposits.

A high cholesterol level may only be revealed if you have symptoms of atherosclerosis. These can include:

- **Angina**, caused by narrowed coronary arteries in the heart,
- **Leg pain on exercising**, due to narrowing of the arteries that supply the lower limbs,
- **Blood clots and ruptured blood vessels**, which can result in a stroke or mini-stroke (transient ischemic attack (TIA)),
- **Ruptured plaques**, which can lead to a blood clot forming in one of the arteries delivering blood to the heart (coronary thrombosis), and may lead to heart failure if a significant amount of heart muscle is damaged, and
- **Thick yellow patches** (xanthomas) around the eyes or elsewhere on the skin. These are cholesterol deposits and can often be seen in people with inherited or familial cholesterol (where your family members have a history of high cholesterol).

## CAUSES

A number of different factors can contribute to high blood cholesterol:

### 1. *Lifestyle risk factors*

There are a number of preventable lifestyle-related risk factors that can increase your risk of developing high blood cholesterol.

They include:

- **Unhealthy diet** - some foods contain cholesterol (known as dietary cholesterol) for example, liver, kidneys and eggs. However, dietary cholesterol has little effect on blood cholesterol. More important is the amount of saturated fat in your diet. Foods that are high in saturated fat include, red meat, meat pies, sausages, hard cheese, butter and lard, pastry, cakes and biscuits, and cream, such as soured cream and crème fraîche,
- **Lack of exercise or physical activity** - can increase your level of bad cholesterol (LDL), and decrease your level of good cholesterol (HDL),
- **Obesity** - if you are overweight you are likely to have an increased level of LDL and a decreased level of HDL, increasing your overall blood cholesterol level.
- **Smoking**, and
- **Drinking excessive amounts of alcohol** -the recommended amount is 3-4 units a day for men, and 2-3 units a day for women.

## 2. *Treatable risk factors*

- **Hypertension** (high blood pressure),
- **Diabetes**,
- **A high triglyceride blood level**, and
- **Medical conditions**, such as kidney and liver diseases, and an under-active thyroid gland.

## 3. *Fixed risk factors*

- **A family history of heart disease or stroke** - you are more likely to have high cholesterol if you have a close male relative (father or brother) aged under 55, or a female relative (mother or sister) aged under 65, who has been affected by coronary heart disease or stroke.
- **A family history of cholesterol related conditions** for example, if a close relative, such as a parent, brother, or sister has familial hypercholesterolemia, or combined hyperlipidaemia.
- **Being male**- men are more at risk of having high blood cholesterol than women,
- **Age**- the older you are, the greater the likelihood of developing atherosclerosis,
- **Early menopause in women**, and
- **Ethnic group** people who are of Indian, Pakistani, Bangladeshi, or Sri Lankan descent have an increased risk of high blood cholesterol.

If you have a fixed risk factor (or a number of fixed risk factors) it is even more important to ensure that you take steps to address any lifestyle, or treatable risk factors that you may also have.

## DIAGNOSIS

To measure cholesterol, a simple blood test is often carried out. Before the test is done, you may be asked not to eat for 12 hours (usually including night time when you are asleep). This ensures that all food is completely digested and will not affect the outcome of the test. Your GP, or practice nurse, can carry out the blood test, and will take a sample either using a needle and a syringe, or by pricking your finger.

The blood sample that is taken during the blood test will be used to determine the amount of LDL (bad cholesterol), HDL (good cholesterol), and triglycerides in your blood. Blood cholesterol is measured in units called millimoles per litre of blood (mmol/litre). It is recommended that you have a total blood cholesterol level of less than 5mmol/litre, and an LDL cholesterol level of under 3mmol/litre.

Anyone can have their blood cholesterol level tested, but it is particularly important to have it checked if:

- **You are aged over 40.**
- **You have a family history of cardiovascular disease** for example, if your father or brother developed heart disease, or had a heart attack, or a stroke before the age of 55, or if your mother or sister had these conditions before the age of 65.
- **A close family member has a cholesterol related condition**, such as familial hypercholesterolemia, or combined hyperlipidaemia.
- **You are overweight or obese.**
- **You have high blood pressure** (hypertension), or
- **You have a medical condition**, such as a kidney condition, an under-active thyroid gland, or acute inflammation of the pancreas (acute pancreatitis). This is because these conditions can cause an increased level of cholesterol.

In assessing your risk of cardiovascular disease, heart attack, or stroke, your cholesterol ratio should not be taken on its own. A number of lifestyle factors should also be taken into consideration. For example:

- Smoking
- Diet
- BMI (body mass index - your weight in relation to your height)
- Treatable risk factors, such as high blood pressure (hypertension) and diabetes
- Fixed risk factors, such as your age, sex, and ethnicity

## TREATMENT

If you have been diagnosed with high cholesterol, the first method of treatment will usually involve making some changes to your diet (adopting a low fat diet), and ensuring that you take plenty of regular exercise. After a few months, if your cholesterol level has not dropped, you will usually be advised to take cholesterol lowering medication.

## DIET

Ensuring that you have a healthy diet by changing to one that is low in saturated fats can reduce your level of LDL or bad cholesterol. If you are in a high risk category of getting cardiovascular disease, altering your diet will not lower your risk. However, eating a healthy, balanced diet has many other health-related benefits as well as reducing your cholesterol level. A healthy diet includes foods from all of the different food groups carbohydrates (cereals, wholegrain bread, potato, rice, pasta), proteins (for example, from lean meat, such as chicken and oily fish, like mackerel or sardines), and fats (varieties that unsaturated, such as low fat mono- or poly-unsaturated spreads, and vegetable or sunflower oil). You should also eat at least five portions of a variety of different fruit and vegetables daily.

## CHOLESTORAL LOWERING MEDICATION

There are several different types of cholesterol lowering medication which work in different ways. Your GP will be able to advise you about the type of treatment that is most suitable for you.

Commonly prescribed medication includes:

- **Statins** (HMG-CoA reductase inhibitors). Statins, such as simvastatin and atorvastatin, work by blocking the enzyme (chemical) in your liver that is needed for making cholesterol. Statins are used to reduce your cholesterol to less than 4 mmol/l and your LDL cholesterol to less than 2 mmol/l. They are therefore useful in preventing and treating atherosclerosis which can cause chest pain, heart attacks, and strokes. Statins sometimes have mild side effects which can include constipation, diarrhea, headaches, and abdominal pain.
- **Aspirin** may be recommended, depending on your age and a number of other factors. A low daily dose of aspirin can prevent blood clots from forming. (Children under 16 years of age should not take aspirin).
- **Niacin** is a B vitamin that is found in foods and in multi-vitamin supplements. In high doses, available by prescription, niacin lowers LDL cholesterol and raises HDL cholesterol. Minor side effects include flushing or tingling skin, itching, and headaches.

- **Other medications**, such as cholesterol absorption inhibitors (ezetimibe), and bile-acid sequestrants, are also sometimes used to treat high cholesterol. However, they may be less effective than other forms of treatment and have more side effects.

If you have high blood pressure (hypertension), your GP may also prescribe medication to lower it.

## More information on Statins

Statins are world's most prescribed drugs and are used to reduce cholesterol. The reason statins are so popular is because heart disease is the world's second biggest cause of death after cancer. Therefore, reducing cholesterol if high will greatly reduce the risk of heart disease and death. In Ireland in 2000, heart disease was the leading cause of death being responsible for 41% of all deaths.

### Cholesterol lowering medication

There are several different types of cholesterol lowering medication which work in different ways. The most commonly prescribed cholesterol drugs are called statins. There are several types of statins on the market, but they all work in the same way.

Examples of statins available on the market and their brand names are as follows:

- Atorvastatin (ie) **Lipitor<sup>®</sup>**
- Pravastatin (ie) **Lipostat<sup>®</sup>, Pravatin<sup>®</sup>**
- Rosuvastatin (ie) **Crestor<sup>®</sup>, Rosuva<sup>®</sup>**
- Simvastatin (ie) **Zocor<sup>®</sup>, Inegy<sup>®</sup>, Sivatin<sup>®</sup>**

Statins are only available with doctor's prescription in Ireland. However, simvastatin has recently become available over the counter in pharmacies in the UK; however they are sold under strict guidelines.

Clinical trials show that statins are very effective at reducing cholesterol and hence heart disease. Statins are one of the major reasons for the significant fall in death rate from heart disease in Ireland over the last 20 years. Statins work by blocking the enzyme HMG-CoA reductase, which plays an important role in the production of cholesterol in the liver. They are therefore useful in preventing and treating atherosclerosis (blockage of coronary arteries) which can cause chest pain, heart attacks, strokes and cardiac deaths.

Most statins must be taken at night, as most cholesterol is made while we sleep. In fact, the only statin which does not have to be taken at night is Lipitor<sup>®</sup>, which can be taken morning or night. Statins are more effective in reducing LDL cholesterol than other cholesterol medication.

However, they are less effective than fibrates in reducing triglycerides. Fibrates are another type of cholesterol lowering medicines which are not used as often as statins. They are more associated with gastrointestinal side effects such as nausea (eg gemfibrozil (Lopid<sup>®</sup>).

Other non-statin drugs used to lower cholesterol include ezetimibe (Ezetrol<sup>®</sup>) which reduces the absorption of cholesterol and is used instead of a statin if a statin is not tolerated or in addition to a statin if a statin is not reducing cholesterol sufficiently. Omega 3 supplements such as Omacor<sup>®</sup> are now available on prescription to lower triglycerides and are usually added to statin therapy when triglycerides are high.

### **How effective are statins?**

A study published in the British Medical Journal in 2003 showed that on average, statins reduce LDL cholesterol by 1.8 mmol/litre. This resulted in a 60% reduction in the risk of cardiovascular events such as heart attacks, clots and sudden cardiac death and a 17% reduction in the risk of stroke.

### **Which statin is best?**

There is no major study to show which statin is most effective. However the CURVES study in America in 1998 showed that atorvastatin is more effective than other statins at lowering cholesterol. However, another study published in the American Heart Journal in 2006 showed that there was no significant difference between atorvastatin and other statins (simvastatin and pravastatin) at reducing heart disease.

### **Who should be prescribed statins?**

In Ireland, over 20% of adults are at risk of coronary heart disease due to high cholesterol.

There is some controversy on who should be prescribed statins. The general guideline for people who have no previous heart problems is that they should be used if cholesterol is high (over 6mmol/litre) and a there is a cardiovascular risk of greater than 20% over the next 10 years. Your cardiovascular risk over 10 years is your risk of having any cardiovascular event such as stroke or heart attack over the next 10 years. It depends on many factors such as your age, sex, weight, blood pressure, cholesterol, family history of heart disease, whether you smoke or are diabetic. Your doctor can calculate your cardiovascular risk. In Whelehans, we calculate cardiovascular risk as part of our heart screening service.

For those who have already suffered a cardiovascular event such as a stroke, statins are recommended if total cholesterol is over 3.5mmol/l. Guidelines state that they should be considered in all diabetic patients over 40. Statins are very frequently prescribed in the elderly as elderly patients generally have a higher risk of heart disease.

## Side effects

Like all medication, statins can cause side effects. The most serious side effect of statins is a muscle complaint called myalgia. It is characterised by muscle pain and weakness. If it occurs the statin should be stopped as it can lead to a potentially fatal condition called rhabdomyolysis. It is estimated that one in 1000 people using statins may suffer from myalgia and one in 10,000 may suffer from rhabdomyolysis. You should report to your doctor immediately if you suffer from muscle pain, tenderness or weakness while taking a statin.

Statins can also raise liver enzymes which can lead to liver problems. It is very important that doctors do a liver function test for those starting statins. Current guidelines are to get a liver function test before starting a statin, 3 months after starting and again after 12 months.

Gastrointestinal effects (nausea, indigestion, constipation, diarrhoea and flatulence) are the most common side effects of statins. Headache, dizziness and rash occur less frequently. Sleep disturbance can occur, although it seems to be more of a problem with simvastatin and atorvastatin. The good news is that the majority of people who take statins have no problems and they are proven to save lives by preventing heart disease.

All statins apart from Lipitor now have equally effective but less expensive generics available. Whelehans stock all these generics. Always ask your pharmacist for the generic version. A generic version of Lipitor is due for release in May 2012.

## Preventing Side Effects

Statins reduce Co Enzyme Q10, a vital nutrient in almost every cell of the body. Reduction in the level of Co-enzyme Q10 is a reason for many of the side effects of statins. Whelehans own brand Co Enzyme Q10 contains 100mg of Co Enzyme Q10 so helps prevent side effects of statins such as:

- Headaches
- Tired aching muscles
- Muscle cramps
- General fatigue

If you currently take a statin and experience a side effect such as headache, I would advise trying Co Enzyme Q10. I have seen Co Enzyme Q10 stop the side effects of statins in many people. Whelehans own brand Co Enzyme Q10 is an affordable option and unlike many Co Enzyme Q10 supplements, it only needs to be taken once daily (Price €14.99). If you have high cholesterol, statins are very important way of prolonging your life so it is important not to give them up if possible.



## COMPLICATIONS OF HIGH CHOLESTEROL

High cholesterol levels can be made worse by any other medical conditions you may have. Medical problems such as an under-active thyroid gland, an overactive pituitary gland, liver disease, or kidney failure, can all contribute to high cholesterol levels.

Some people have inherited disorders, such as familial hypercholesterolemia, or combined hyperlipidaemia, that prevent fats from being used properly and eliminated from the body. This allows the level of cholesterol to build up in the blood.

The major complications of raised blood cholesterol are heart attacks, strokes and arterial disease. The risks of all of these are increased if:

- You are overweight.
- Smoke.
- Have high blood pressure.
- You have a strong family history of these conditions, or
- You are diabetic.

## PREVENTION

You can help prevent high blood cholesterol by eating a healthy, balanced diet that is low in saturated fat. Including a small amount of unsaturated fats in your diet can be a healthy choice, as this type of fat can actually reduce cholesterol levels. Current thinking is that the traditional Mediterranean diet, with its emphasis on raw olive oil in many foods, and low animal-fat content, is effective in ensuring cardiovascular health (the health of the heart and blood circulation).

Foods high in unsaturated fats include:

- Oily fish
- Avocados
- Nuts and seeds
- Sunflower, rapeseed and olive oil
- Vegetable oils

### Weight loss

Losing weight is an important first step in helping you lower cholesterol. The best way to lose weight is to reduce your calorie intake and increase exercise. There is no quick fix to weight loss; it will take time, perseverance and hard work. However the benefits to your physical and mental health are outstanding. If you need a little extra motivation, support and help in losing weight, Whelehans now have an excellent weight loss clinic which includes a privately weekly weigh in to give you the motivation and support to lose weight. Our weight loss clinic takes place every Monday.

Whelehans provide a weight loss support supplement called Tone & Slim<sup>®</sup>. Tone & Slim<sup>®</sup> provides Conjugated Linoleic Acid (CLA), a Fatty Acid which we lack in our normal diet. CLA is a natural supplement and unlike fad diets you do **not** substitute your meals. CLA Tones up slack muscle AND reduces existing body fat. Additional help with weight loss will be obtained from Sanafil<sup>®</sup>, a supplement formulated to naturally reduce appetite.

## CAN NATURAL MEDICINES HELP?

There are natural remedies that can help reduce your cholesterol. While they can be very beneficial to your general health, their effectiveness in reducing cholesterol is minimal, especially if the main cause of your cholesterol is genetic. The best way of losing cholesterol naturally is losing weight, having a healthy low fat diet and exercising regularly. Here are some natural products stocked by Whelehans that may help reduce your cholesterol levels and keep it low.

### Lecithin

Lecithin reduces cholesterol by binding cholesterol and fats to water in your intestinal tract, hence reducing the absorption of cholesterol. Whelehans Lecithin 1200mg Caps are only €6.99 per 90

### Omega-3

Fish oil stimulates blood circulation, increases the breakdown of fibrin, a compound involved in clot and scar formation, and additionally has been shown to reduce blood pressure. There is strong scientific evidence that omega fatty acids reduce blood triglyceride levels and regular intake reduces the risk of secondary and primary heart attack. Omega 3 supplements are beneficial if you don't eat a lot of fish. Whelehans Omega 3 supplement is €5.50 per 30.

### Garlic

Garlic is beneficial in preventing heart disease in many ways. Some recent studies show that it beneficial in lowering total cholesterol including bad LDL cholesterol. It may help in preventing clots and there is some evidence of its benefits in lowering blood pressure. Whelehans Odourless Garlic Capsules are €3.95 per 30

**Disclaimer: Please ensure you consult with your healthcare professional before making any changes recommended**

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